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that he can distinguish generic and specific microscopic characters.

*Vinegar Plant—Growth of, in Fermented Grape Juice.*—N. L.

Britton. (Trans. N. Y. Acad. Sci., vi., pp. 66-70; reprinted.)

Describes the gelatinous, stratified cylinders formed by an organism identified as *Saccharomyces cerevisiæ*, Reess, and the appearance of *Penicillium* and other moulds on exposure of these to the air.

*Willows—Two Beautiful North American.*—H. Zabel. (Gartenflora, xxxvi., pp. 410-412, figs. 98-100.)

This paper gives minute descriptions of *Salix lasiandra*, Benth., var. *lancifolia*, (Anders.), Bebb, and *S. nigra*, Marsh., var. *falcata*, (Pursh), Gray. In regarding Andersson's *S. lancifolia* as a variety of *S. lasiandra* the author takes occasion to remark: "I follow in the naming the profound connoisseur of the North American Willows, Michael S. Bebb, of Illinois, to whom Greene has recently dedicated a new genus of Compositæ."

*Zannichellia palustris—Le mode de Fécondation du.*—M. E. Roze.

(Journ. de Bot., i., pp. 296-299; illustrated.)

### Reviews of Foreign Literature.

*Notes on Hackel's Monograph of Gramineæ.*—Prof. E. Hackel, of St. Poelten, Austria, who is one of the best living agrostologists, has recently published as a part of "Engler and Prantl's *Natürliche Pflanzenfamilien*," a monograph of the order Gramineæ, which is of particular interest as representing the views of European botanists as to the subdivisions of this vast order. The primary divisions are the same as those of Bentham and Hooker, although not in the same relative order. But in the distribution into genera, there are many changes. Sometimes these changes are in the reduction of genera to sections, and sometimes in the elevation of sections to genera.

The whole number of genera recognized by Prof. Hackel is 313, whereas the whole number given by Bentham and Hooker is 298. There are a few new genera established since the publication of the "*Genera Plantarum*" of Bentham and Hooker, which accounts partly for the increased number. It may be interesting to note such of the changes as relate to the grasses of the United States.

*Hemarthria* is reduced to a section of *Rottbællia*. *Sorghum*, *Chrysopogon* and *Heteropogon* are made sections of *Andropogon*. *Zizania miliacea*, Michx., becomes *Zizaniopsis miliacea*, Dcëll. and Acherson. *Calamagrostis* includes two sections, *Epigeos* and *Deyeuxia*. *Ammophila* he recognizes as having but one species, *A. arundinacea*. This excludes three North American species which Benthams and Hooker included in *Ammophila*, viz.: *A. longifolia*, *A. brevipilis* and *A. Curtisii*, Vasey. These belong to Dr. Gray's section *Calamovilfa* of the genus *Calamagrostis*, as defined in the Manual, and characterized by the hard parchment-like, one-nerved glumes, and the absence of the sterile flower or pedicel. They differ from *A. arundinacea*, Host, in the spicate panicle, and the five-nerved rather scabrous glumes of the latter. If, therefore, our species be placed in the genus *Ammophila*, they must constitute a section *Calamovilfa*. They might very well form a new genus.

*Dactyloctenium*, Willd., included by Benthams and Hooker in *Eleusine*, is here retained as a genus.

The genus *Eremochloë*, Watson, receives the name *Blepharidachne*, Hack., because the name *Eremochloa*, Büse., given to an East Indian grass allied to *Hemarthria*, antedates the name of Watson. *Triplasis*, Beauv., is reduced to a section of *Triodia*, Br. In this place I may remark that our *Triodia seslerioides* has an earlier name, i. e. *Triodia cuprea*, Jacq., Ecl. ii., 21. *Arctophila*, Rupt., is here made a section of *Colpodium*, Trin., and the genus *Atropis*, Rupt. reduced to a section of *Glyceria* by Benthams and Hooker, is here again raised to generic rank.

GEO. VASEY.

*New Contributions to our Knowledge of Sieve-Tubes.*—By Alfred Fischer.\*

The author has introduced a simple method which enables us to obtain a more correct knowledge of sieve-tubes than we have had heretofore. When a part of a plant is cut off, the fluid in the sieve-tubes will partly flow out, and the current produced in them will cause an entirely new arrangement of their contents. The well-known illustrations of the sieve-tubes of *Cucurbita*, etc.,

\*Ber. d. K. Sächs. Ges. d. Wiss. zu Leipzig, Math.-phys. Cl., 1886, iii., iv., pp. 291-336, 2 pl.

in all our text-books, with their accumulations of mucilage above or below the sieve-plates, ("Schlauchköpfe") etc., must therefore be considered as representations of entirely artificial conditions.

The author simply immerses the entire plant, or a portion of it, (while still in connection with the plant) in hot water; thereby the contents of the sieve-tubes will be fixed and the changes mentioned almost entirely prevented.

According to their contents the sieve-tubes are divided into three groups: first, such as contain sap which coagulates when heated, and which is surrounded by a thin parietal plasma sac (*Cucurbita*); second, sieve-tubes containing mucilage masses closely in contact with the parietal plasma, and clear sap which does not coagulate (*Humulus*); third, sieve-tubes with starch grains, with only little mucilage in the parietal plasma, and with sap which does not coagulate. This differentiation of the contents is met with only in active tubes, *i. e.* in such as have their plates open.

The sieve-plates of active tubes are lined with a thin layer of callus which, in its turn, is covered with mucilage either entirely or only at the edges of the perforations. The parietal protoplasm most likely lines the sieve-plates and also the short canals piercing the same, so as to effect a connection of the plasmatic layers of the contiguous members of the tube.

When a plant is injured accumulations of mucilage are formed at the plates by the streaming of the sap through the pores. At the same time the mucilaginous lining of the plates disappears, while the callus increases in thickness. Both the callus plates and the aggregations of mucilage, therefore, are artificial products, for in the living, active sieve-tubes there is only very little callus on the sieve-plates. In the living plant the pores of the sieve-tubes are not filled with mucilage as long the sieve-tube is active, but with coagulable sap in *Cucurbita*, and probably with watery sap in other plants.

The obliteration of the cribrose tubes begins with changes of the contents and the plates. In *Cucurbita* there appear in the sap some drops of mucilage and a coarse coagulum. Then the sap becomes quite rigid, but soon separates into small portions which are again dissolved and removed, or the sap gradually loses its

coagulable ingredients without becoming rigid, and finally the protoplasm and mucilage disappear also. The plates always obliterate by the thickening of the callus layer and the narrowing of the pores. The effect of the latter change is that the mucilage lining the pores is changed into massive threads (*Cucurbita*) which become thinner and thinner until they disappear, being most likely transformed into callus. When the obliterating sieve-tubes are injured no accumulation of mucilage at the plates can be formed, because the mucilage contained in them is not fluid but rigid like caoutchouc.

The sieve-tubes are in direct communication with one another and with their accompanying cells by means of delicate threads; not, however, with the cambiform cells, which, in their turn, are connected by threads of protoplasm. J. S.

*Observations on Diatomaceæ from the Neighborhood of Hertford.*—Isaac Robinson. (Trans. Hertfordshire Nat. Hist. Society, vol. iv., part 7.)

The writer alludes to the fact that after a heavy rain the coloring matter of rivers often consists largely of diatoms. He also records his observations of cysts containing young diatoms in various stages of development. Appended is a list of 154 species found in Hertfordshire, mostly in the vicinity of Hertford.

C. H. K.

### Botanical Notes.

*Botanical Section of the Biological Society of Washington.*—We have received a brief abstract of the papers delivered at the first meeting, from the Secretary. Prof. Burgess spoke on the Fresh-water Algæ, reviewed the literature of the subject, and called special attention to the work of American botanists. Prof. F. H. Knowlton followed with some remarks on "A Case of Sewer Obstruction by the Roots of Trees." Prof. S. M. Tracy described some Fungi from the Arid Regions, collected during a recent trip, including twenty-five species of *Erysiphe*. Several new *Puccinas* and *Æcidiums* were also collected. Miss E. A. Southworth read a paper on the *Gleosporium* of the Wax Bean (*G. Lindemuthianum*), as a result of some studies carried on under the direction of Prof. F. L. Scribner.